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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/494,877	01/31/2000	Zhigang Fang	70239-00086	4072
58688	7590	05/10/2011		
CONNOLLY BOVE LODGE & HUTZ LLP			EXAMINER	
P.O. BOX 2207			YANG, JIE	
WILMINGTON, DE 19899				
			ART UNIT	PAPER NUMBER
			1733	
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			05/10/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

09/494,877

Applicant(s)

FANG ET AL.

Examiner

JIE YANG

Art Unit

1733

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 7, 11-14, 19-21, 25-27, 29, 33, 34, 37 and 41-44 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

- 5) ☐ Claim(s) _____ is/are allowed.

- 6) ☒ Claim(s) 1, 7, 11-14, 19-21, 25-27, 29, 33, 34, 37 and 41-44 is/are rejected.

- 7) ☐ Claim(s) _____ is/are objected to.

- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-943)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/10/2011 has been entered.

Status of the Claims

Claims 1, 7, 11-14, 19-21, 25-27, 29, 33, 34, 37, and 41-44 remain for examination, wherein claims 1, 14, 25, 33, and 43 are independent claims.

Status of the Previous Claims

Previous rejection of claims 1, 7, 11, 12, 14, and 19-21 under 35 U.S.C. 103(a) as being unpatentable over JP 05-156301 (From abstract and machine translation, thereafter JP'301) as evidenced by Nakamura et al (US 5,934,542, thereafter US'542) and in view of JP 10-284547 (Abstract, figure, and table, thereafter JP'547) is withdrawn in view of the remarks filed on 7/10/2011 and the interview on 5/4/2011.

However, upon further consideration, a new ground(s) of rejection is made as following.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 14, 25, 33, and 43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In the instant case, the feature of "cermets material consisting of" in the instant claims is not disclosed by the original specification. The Applicant pointed out that an example on page 11 lines 2-12 of the instant specification provides support for "consisting of" language in the instant independent claims 1 and 14 in the interview on 5/4/2011. The Examiner carefully checks the disclosure in the instant specification and notes that binder alloy comprising about 47.6wt%Fe; 29wt%Ni; 19wt%Co; 0.3wt%Mn, and 0.3wt%C that is total 96.2wt% of the alloy (page 11, lines 2-12 of the instant specification). The Examiner further notes that there is no limitation to limit adding other phases except from first and second phases are not excluded from the composition (refer to page 15 lines 5-13 of the instant specification). Furthermore, instant claim 25 indicates including third phase in the alloy, which is contrary to the limitations of only including first and second phases as recited in the instant claims 1, 14, 33, and 43. Therefore, the rejection for the instant claims 1, 14, 25, 33, and 43 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement is still proper.

Claim Objections

Claims 1 and 14 are objected to because of the following informalities: in the instant case, there is limitation of iron-based binder alloy consisting of a blend of iron with Co, Ni, C, and Mn (claim 1) or binder alloy consisting of a mixture of Co, Ni, Fe, C, and Mn (claim 14), at same time the instant claims indicate "comprising" 10-30wt%Co in binder alloy, which renders the claims unclear. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 7, 11, 12, 14, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sue et al (US 2006/0222853, thereafter, PG'853) in view of JP 05-156301 (From abstract and machine translation, thereafter JP'301) and Nakamura et al (US 5,934,542, thereafter US'542).

Regarding claims 1 and 14, PG'853 teaches that cemented WC can be used as cutting inserts in roller cone rock bits, where the WC is combined with alloys from the group consisting of Co, Ni, Fe, and others ([0009] of PG'853). PG'853 also teaches a composite construction having a core of WC and Co powder surrounded by a shell of cobalt metal ([0032] of PG'853). The Co

powder can be replaced with alloys of Ni and Fe ([0009] of PG'853), which reads on the cermets material consisting of WC and binder alloy as recited in the instant claims. PG'853 does not specify the proportion of the WC and binder alloy as recited in claims 1 and 14. JP'301 teaches mixing Super INVAR powder and a ceramic powder in 75:25 to 25:75 mixture and the mixture is sintered (Abstract of JP'301). JP'301 teaches the ceramic includes a carbide ([0006] of JP'301). JP'301 teaches that the sintered mixture can be used in powder machine parts, an electric device and measuring equipment such as IC boards [0001-0002]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to partially replace Co binder of PG'853 with the Super INVAR binder alloy of JP'301 for the cermets material of PG'853 to meet the requirement of 10-30wt%Co limitation as recited in the instant claims because JP'301 teaches using similar material (carbides) for the same component, i.e. IC equipment as recited in the instant invention and JP'301 teaches the sintered material has low thermal expansion characteristics (abstract of JP'301). Because the Super INVAR of JP'301 has a composition of 64wt%Fe; 31wt%Ni; 5wt%Co; 0.3-0.4wt%Mn; and 0.07wt%C as evidenced by US'542 (Col.17, lines 51-56 of US'542). All of these elements are included in the alloy composition disclosed in the instant

claims, which meets the "consisting of" language of the instant claims. Furthermore, US'542 teaches applying Kovar alloy as binder alloy and US'542 teaches Kovar alloy has a composition of 64wt%Fe; 29wt%Ni; 17wt%Co; and at most 0.5wt%C and Mn (Col.17, lines 47-50 of US'542), which reads on the Co composition range of 10-30wt% as recited in the instant claims. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Kovar alloy as binder alloy as demonstrated by US'542 in the cermets material of PG'853 in view of JP'301 because US'542 teaches that Kovar is a ferrous alloy of a low coefficient of thermal expansion (Col.17, lines 47-50 of US'542).

Still regarding claim 1 and claim 20, the coefficient of thermal expansion is recognized as a property of the material, which depends on materials and the treating process. PG'853 in view of JP'301 and US'542 teaches the similar WC-Fe-base binder system and the similar sintering process as recited in the instant invention, a similar coefficient of thermal expansion as claimed would be highly expected in the material system of PG'853 in view of JP'301 and US'542. MPEP 2112.01. Furthermore, JP'301 teaches the coefficient of thermal expansion of the ceramics within the claimed range as shown in Table 4 and [0016] (i.e. 1.2-6.5ppm/°C).

Regarding claims 7 and 19, US'542 teaches Kovar alloy has a composition of 64wt%Fe; 29wt%Ni; 17wt%Co; and at most 0.5wt%C and Mn (Col.17, lines 47-50 of US'542) and US'542 teaches Super INVAR has a composition of 64wt%Fe; 31wt%Ni; 5wt%Co; 0.3-0.4wt%Mn; and 0.07wt%C as evidenced by US'542 (Col.17, lines 51-56 of US'542). The Ni compositions taught by US'542 is within the Ni range of 10-40wt% as recited in claims 7 and 19.

Regarding claims 11, 12, and 21, the coefficient for thermal expansion of WC is 5.2ppm/°C (refer to page 6, lines 31-32 of the instant specification). The absolute difference between the mixture of JP'301 and that of WC would range from 0-4.0ppm/°C, which is within the claimed range of claims 11, 12, and 21. The coefficient for thermal expansion of WC-Co is 5-6ppm/°C (refer to page 12, lines 21-22 of the instant specification). Therefore the coefficient for thermal expansion of the mixture of PG'853 in view of JP'301 and US'542 overlaps the range of being less than WC-Co. In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a prima facie case of obviousness exists. See MPEP 2144.05.

Claims 13, 25-27, 29, 33, 34, 37, 41-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sue et al (US 2006/0222853, thereafter, PG'853) in view of

JP'301 and US'542 and further in view of JP 10-284547 (Abstract, figure, and table, thereafter JP'547).

Regarding claims 13, 33, 34, 37, 41, and 42, PG'853 teaches a roller cone rock bit comprising three legs with a roller cutter cone mounted on the lower end of each leg. The cutting inserts are provided in the surfaces of the cutter cone ([0063] of PG'853). PG'853 teaches that cemented WC can be used as cutting inserts in roller cone rock bits, where the WC is combined with alloys from the group consisting of Co, Ni, Fe, and others ([0009] of PG'853). PG'853 also teaches a composite construction having a core of WC and Co powder surrounded by a shell of cobalt metal ([0032] of PG'853). The Co powder can be replaced with alloys of Ni and Fe ([0009] of PG'853). WC dispersed in Co phase is further evidenced by JP'547. JP'547 teaches a contact tool for lead material bonding in IC chip used in semiconductor devices that contain a tool base made of WC dispersed in a phase of Co (Abstract of JP'547). PG'853 in view of JP'547 does not specify that the inserts are made with the composition of claim 1 as in claim 14 or the composition in claim 33. JP'301 in view US'542 is further applied as discussed above with respect to the first and second phases in claim 33, the composition of Ni in claim 37, the thermal expansion of WC-

Co in claims 41 and 42, and the difference between the coefficients of thermal expansions in claims 42. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the composition of JP'301 in view of US'542 in the cermet material of PG'853 in view JP'547 because this binder has a low coefficient of thermal expansion. Known work in one field of endeavor may prompt variations of it for use in either the same field of a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art.

Regarding claims 25-27 and 29, PG'853 teaches a composite construction having a core of WC and Co powder surrounded by a shell of cobalt metal ([0032] of PG'853), which reads on the third phase material as recited in the instant claims. The Co powder can be replaced with alloys of Ni and Fe ([0009] of PG'853). However, PG'853 does not specify the second phase of binder alloy as claimed. JP'301 in view of US'542 and JP'547 is applied as discussed above with respect to the first and second phases in claim 25, the thermal expansion of WC-Co in claim 26, the coefficient of thermal expansion in claim 27, and the difference between the coefficients of thermal expansion of claim 29. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the binder

composition as the mixture in JP'301 in view of US'542 and JP'547, since the composition of JP'301 in view of US'542 and JP'547 has a low coefficient of thermal expansion. Known work in one field of endeavor may prompt variations of it for use in either the same field of a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art.

Regarding claims 43 and 44, PG'853 teaches a composite construction having a core of WC and Co powder surrounded by a shell of cobalt metal ([0032] of PG'853) to form coated fibers. The composite construction has an oriented microstructure and the fibers are bundled together ([0008] of PG'853). The Co powder can be replaced with alloys of Ni and Fe ([0009] of PG'853). However, PG'853 does not specify the binder alloy as in claim 43 or the properties as in claims 43 and 44. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the binder composition as the mixture in JP'301 in view of US'542 and JP'547, since the composition of JP'301 in view of US'542 and JP'547 has a low coefficient of thermal expansion. Known work in one field of endeavor may prompt variations of it for use in either the same field of a different one based on design incentives or other

market forces if the variations are predictable to one of ordinary skill in the art.

JP'301 in view of US'542 and JP'547 teaches WC with Fe base binder alloy, which reads on the limitations of first phase including WC and second phase including Fe based binder alloy as recited in the instant claims 25, 33, and 43. PG'853 in view of JP'301, US'542 and JP'547 teaches WC with Fe base binder alloy as discussed above. Super INVAR of JP'301 has a composition of 64wt%Fe; 31wt%Ni; 5wt%Co; 0.3-0.4wt%Mn; and 0.07wt%C as evidenced by US'542 (Col.17, lines 51-56 of US'542) and US'542 teaches that Kovar alloy has a composition of 64wt%Fe; 29wt%Ni; 17wt%Co; and at most 0.5wt%C and Mn (Col.17, lines 47-50 of US'542). All of these elements are included in the alloy composition disclosed in the instant claims, which meets the "consisting of" language of the instant claims.

Response to Arguments

Applicant's arguments with respect to claims 1, 7, 11-14, 19-21, 25-27, 29, 33, 34, 37, and 41-44 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jie Yang/
Patent Examiner, Art Unit 1733